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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/868,792	06/21/2001	Hans-Dieter Block	MO-6379/LEA3	5075

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EXAMINER	
MANOHARAN, VIRGINIA	
ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/868,792	BLOCK ET AL.	
	Examiner	Art Unit	
	Virginia Manoharan	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06/21/01*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The abstract of the disclosure is objected to because of the inclusion of legal phraseology often used in patent claims such as: "comprising" recited in the last line of the abstract. Correction is required. See MPEP § 608.01(b).

The specification had not been checked to the extent necessary to determine the presence of all possible minor errors e.g., typographical, grammar, idiomatic, syntax and etc. Applicants' cooperations are requested in correcting any errors of which applicants may become aware in the specification.

Claims 15-28 are objected to because of the following informalities:

a. In claim 18, line 1 "the product mixture obtained" should be the--SH4—containing product discharged—for consistent use of terminology in the claims. Compare with the last line of claim 15.

b. In claims 21-23, "the intermediate condenser "should be—the at least one intermediate condensert--, again for consistency reason. See claim 20, section 4, reciting "at least one intermediate condenser".

.c. The claimed "..the direction of flow of the lower—boiling product mixture coming the intermediate condenser.." in claims 23 and 24 lacks antecedent basis for support, as it is not initially recited in the base claim. Also, the following limitations such as: "the rectifying section" in claim 25; and "the bottom outlet of the separation column" in claim 28 both lack antecedent supports.

d. Is the claimed "a condenser" in claim 26 the same or different from the condensers recited in claim 20?

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 is an incomplete claim as it depends on a cancelled claim 1.

Claim 15 is rejected under 35 U.S.C. 112, first and second paragraphs, as the claimed invention is not described in such full, clear, concise and exact terms as to enable any person skilled in the art to make and use the same, and fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 appears to be inconsistent with that recited in the specification. Claim 15, step (a), recites "a lower—boiling SiH_4 containing product and a higher-boiling $SiCl_4$—containing bottom product..." and Step (b) recites "removing and condensing the SiH_4—containing product in an intermediate condensation ... and further condensing any SiH_4—containing product that is not condensed in the intermediate condensation in an overhead condenser from which the SiH_4—containing product is discharged as final product. However, the specification at page 7, lines 10-20, recites "intermediate condenser 6 ...partial condensation of higher-boiling components ... the lower-boiling product fractions which are not condensed ... overhead condenser 9, discharged in liquid form as final SiH_4 product obtained. That is, the latter recitations would presupposed , for example, that $SiCl_4$ components are the one condensed in the

intermediate condenser 6, not the SiH_4—containing product as would be presupposed from the former recitations.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (4,610,858) with or without Bakay (3,968,199).

Yamada et al discloses a method for the preparation of silane of formula SiH_4 by catalytic disproportion of trichlorosilane of formula $SiHCl_3$ to form SiH_4 and silicon tetrachloride of formula $SiCl_4$ (column 1, line 46 and 47) in a reactive/distillative reaction zone comprising: introducing $SiHCl_3$ into a reactive/distillative reaction zone comprising a catalyst bed of a catalytically active solid to form a lower-boiling SiH_4 – containing product and a higher-boiling $SiCl_4$-containing bottom product; removing the lower-boiling SiH_4-containing product from the reactive/distillative reaction zone; condensing the SiH_4-containing product in an intermediate condensation; and further condensing any SiH_4-containing product that is not condensed in the intermediate condensation in an overhead condenser from which the SiH4- containing product is discharged as final product as broadly claimed in claim 15. See column 1, lines 25-67. Yamada et al further discloses the apparatus for "..the preparation of silane of formula

SiH_4 by catalytic disproportion of trichlorosilane of formula $SiHCl_3$ to form SiH_4 and silicon tetrachloride of formula $SiCl_4$ in a reaction column having;

(1) a reactive/distillative reaction zone comprising a catalyst bed made of solid bodies of catalytically active solid and through which the disproportion products and trichlorosilane can flow;

(2) an inlet for introducing $SiHCl_3$ into the reaction zone;

(3) an overhead condenser connected to the reaction column for condensing the SiH_4-containing product that is formed and having an outlet for condensed SiH_4 at the overhead condenser;

(4) at least one intermediate condenser arranged between the reactive/distillative reaction zone and the overhead condenser, wherein the intermediate condenser is operated at a temperature, and

(5) an outflow for $SiCl_4$ obtained as bottom product "as broadly claimed in claim 20.

The pressure 1 to 40 Kg/m cm^2, and 0 to 20 Kg cm^2 at column 2, lines 18-22 of Yamada would obviously be within the clamed 1 to 50 bar recited in section (a), of claim 15.

The "-10^{0}C" temperature at column 15, line 15-17 in Yamada's disclosure would be within and render obvious the claimed temperature range –25^{0}C to 50^{0}C in step (b) of claim 15 and section (4) of claim 22.

See also the Table at column 7 of Bakay's carbon trap temperature (condenser's temperature of –24^{0}C and –21^{0}C which are within the above claimed temperature for the intermediate condenser). To combine Yamada and Bakay would have been obvious to one of ordinary skill in the art especially in view of Bakay's suggestion at column 5, lines 40-67, interalia, "..the disproportionation process may be practiced at temperatures as low as about 0^{0}C to as high as about 350^{0}C, though the preferred operating temperatures are typically about 20^{0}C to about 200$_0$C...The process may be carried out under subatmospheric, atmospheric or super atmospheric pressure. Pressure plays a practical role in the utilization of this process as a mechanism for controlling the state of the feed material and disproportionation products during conduct of the reaction.."

Yamada et al further discloses the limitations "all or part of the chlorosilane is returned to the reactive/distillative reaction zone as claimed in claim 19 (see column 8, lines 30-34 and 66-67 through column 9, lines 1-11). Note also claim 28.

Yamada also shows in Fig. 1, the condenser (3) which is deemed to correspond to the claimed "intermediate condenser arranged above the catalyst bed" in column 1 as claimed in claim 22; and shows in Fig. 3, a silane distilling tower (42) which is deemed to read on the claimed separation column as claimed in claim 26.

Moreover, the distillation or enrichment of SiH_4 occurring in any of distillation towers shown in Figs. 2-3 of Yamada would correspond to the claimed rectification/ rectifier (a distiller) as claimed e.g., in claim 23.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Bailey and Litteral both disclose the disproportionation of chlorosilanes.

b. Coleman discloses the production ultra high purity silane.

c. Tarancon discloses a process for the purification of silane.

d. Allen et al discloses the distillation of silane .

e. Perry et al teaches that a rectification unit consists of the still pot, rectification section and still head as major components.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to V. Manoharan whose telephone number is (571) 272-1450.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

V. Manoharan/dh
August 9, 2004

V. MANOHARAN
PRIMARY EXAMINER
ART UNIT 1257 1764

8/10/04